Treatment of Circulatory Disorders of The Lower Extremities

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■ *Successful treatment of the cutaneous changes in patients with arterial insufficiency and venous insufficiency is enhanced by a knowledge of (1) the physiology of the blood vessels in health and in disease (2) the pathologic changes underlying these disorders and (3) the side reactions of drugs as well as their efficacy.*

Treatment of stasis dermatitis often requires elevation of the involved leg at hourly intervals during the days, especially in patients who must continue to work and who must stand for long periods.

In patients with stasis dermatitis, above-the-knee elastic stockings can produce a tourniquet effect in the popliteal space and can be hazardous.

When the cutaneous changes do not heal properly, the physician must be alert to factors which, although seemingly minor, may mean the difference between a successful short course of treatment and chronicity.

SINCE CARE OF patients with cutaneous manifestations of arterial insufficiency, thromboangiitis obliterans, livido reticularis and venous disease is in the province of dermatology, dermatologists need special knowledge of physiological principles pertaining to these conditions, and of the actions and side reactions of certain drugs.

The sites of pathologic changes in these diseases are as follows:

	Arteries	*Veins*	*Capillaries*
Arteriosclerosis obliterans (AO)	+		
Thromboangiitis obliterans (TAO)	+	+	
Livido reticularis	+		+
Stasis dermatitis		+	

AO and TAO are characterized by obstruction and complete occlusion of the lumen of the vessel supplying or returning blood to or from a limb. Insufficient flow of blood results in insufficient delivery of oxygen to tissue. With the limb at rest, this may cause no symptoms, but on walking or other exercise, intermittent claudication may occur. If flow of blood is severely limited, tissue necrosis and ulceration may appear. Diabetes may hasten the disease process.

Medical treatment for AO and TAO is of three categories: Preventive and protective measures, drug therapy and physical therapy.

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As a part of prevention it is necessary to determine whether diabetes or high cholesterolemia is a factor. Diabetic neuritis may account for the symptoms, and corrective measures, including vitamin B_1 injections, may be beneficial. While the relationship between cholesterol and atherosclerosis remains a controversial subject, if cholesterol is found to be elevated on two determinations, a rigid low cholesterol diet is needed. If the patient is obese, the diet must be governed. A high protein diet is beneficial because the high specific dynamic action of protein has been shown to increase the circulation to the extremities. It is important for the physician to be practical in dietary measures.

Walking is permissible as tolerated. It should not be proscribed, particularly for elderly patients, for once they are confined to bed they tend to stay there. The patient may walk long distances provided the pace is slow and he stops when pain appears. This will allow collateral circulation to develop to meet the needs of the limb.

Local pressure must be avoided. Patients must be warned against too firm or too soft a mattress, tight shoes, massage and even crossing of the legs. Application of heating pads and hot water bottles to the skin of the legs impedes tissue healing. Applying heat to the back or abdomen increases peripheral circulation through reflex vasodilation.

The use of tobacco is harmful. The prolonged vasoconstriction which results from smoking may produce a thrombus or initiate gangrene. TAO will not heal unless tobacco is stopped completely.

The foregoing are the main preventive and protective measures, although there are others.

Drug Therapy of AO and TAO

Drugs used in the treatment of AO and TAO includes the following groups: Vasodilators, anticoagulants, antibiotics, hormones, steroids, vitamins, local agents.

The vasodilators act centrally, at sympathetic ganglia and directly on vessels.

Alcohol is the best example of a centrally acting vasodilator. Heating the body at the same time of alcohol intake enhances the degree of vasodilatation. One ounce four times daily is the usual prescription. Examples of agents which block the sympathetic ganglia are tolazoline (Priscoline®), phenoxybenzamine (Dibenzyline®), azapeptine phosphate (Ilidar®) and phentolamine (Regitine).

These drugs block the sympathetic nerve activity without having that effect on para-sympathetic nerves. Priscoline® is a more effective dilator of the lower than of the upper extremities. The usual prescription is 25 mg or 50 mg three times daily. Dibenzyline® is usually prescribed in doses of 10 mg three times daily and Ilidar® is given in a dose of 75 mg three times a day.

The sympathetic blocking agents are of unquestioned benefit in functional vasospastic disease. In organic arterial diseases such as AO and TAO, the benefit probably derives from their action on the functional vasospastic component of these diseases.

Examples of vasodilators acting directly on the vessel wall are nicotinyl alcohol (Roniacol®) and nitroglycerin. Roniacol usually is prescribed in dosage of 100 mg three times daily. The drug has side effects such as generalized flushing and tingling, which often disappear if the drug is continued. Nitroglycerin is more often used for its effect on the cardiac vessel wall than for its peripheral effect.

Anticoagulants have a definite place in the treatment of acute vascular disorders and in chronic peripheral disorders when thromboembolic phenomenon are common. Close supervision is necessary with these agents and they should be prescribed only by one experienced in their use and thoroughly familiar with the side reactions.

Antibiotics are indicated in the presence of ulcers and exudative dermatosis. Fungous infections are more likely to occur in the digital interspaces of patients with AO and TAO than in normal persons. Local therapy is often efficacious in control of mycosis, but it may be more practical and simple to prescribe intermittent courses of griseofulvin.

There is no specific benefit from multiple vitamin therapy. However, vitamin B_1 is helpful in diabetic neuritis and it may benefit patients with vague symptoms of neuritis.

Steroids are of no value in AO and TAO when given orally but are helpful in topical preparations.

As to local therapy, the usual principles and techniques in the care of acute and chronic dermatitis and ulcers apply. Too vigorous massage of the limb and compression for extended periods are deleterious. The protolytic and debridement agents are occasionally helpful in the treatment of ulcers.

Physical Measures

Physical measures include heating the body, postural exercises and use of an oscillating bed. Postural exercises involve maintaining the legs in a horizontal position for ten minutes; then the legs are held down for ten minutes. Alternating these positions for one hour in the morning and one hour in the afternoon is often helpful in relieving pain and congestion. Applying a heating pad at moderate temperature to the sacrum or the abdomen for 15 minutes four times a day may be helpful. Although its main value is psychological, the Sanders oscillating bed is worthy of mention. It teeters slowly, head to foot, for timed periods, keeping the patient's feet up long enough to accomplish venous dumping but not so long as to provoke ischemia, then down long enough to accomplish gravitational pull of blood into the limb but reversing before venous edema might begin.

Livido Reticularis

Livido reticularis in contrast to AO and TAO is predominately a vaso-spastic disease involving young people and mainly women. It persists for many years and is usually benign. However, in a small proportion of cases painful ulceration may appear.

The disease is due to a spasm or, less often, to organic occlusion of the arterioles with concomitant dilatation of the capillaries and venules. A mottled blueness of the legs and arms appears.

The peripheral pulses become faint and the feet and hands become cold, moist and pale. A slight breeze or slight chilling is sufficient to provoke this reaction.

The disease is classified into three categories:

1. *Cutis marmorata* in which the symptoms disappear on warming the limb.

2. *Livido reticularis ideopathica,* the symptoms of which persist in spite of warming the limb.

3. *Livido reticularis symptomatica,* in which the cutaneous symptoms occur in association with a serious underlying disease such as lupus erythematosus or periarteritis nodosa.

Therapy is directed at avoidance of chills and keeping warm. Vasodilating drugs are helpful in small doses. A complete medical evaluation is essential to rule out associated disease.

Recent preliminary studies show that the rauwolfia compounds cause livido reticularis to disappear.

Stasis Dermatitis and Stasis Ulcers

Seventeen per cent of the population has varicose veins. This represents a formidable source of disability. Some persons are born with weak venous valves. In some, the valves are absent in certain segments, and in some the venous walls are weak and after years of dependency they sag. These are the key etiological factors in the stasis syndrome. As a result of these diseased valves, the flow of blood is reversed, the pressure in the veins is increased, drainage of fluid is interfered with, waste products accumulate and stasis dermatitis ensues. If the condition is intense, necrosis of tissue occurs, and then ulceration.

Numerous therapeutic programs are currently in use but none can succeed unless edema is first controlled.

Above-the-knee stockings can be a hazard because of tourniquet effect in the popliteal space, especially when the knee is bent. Knee-length stockings are sufficient.

In patients with arterial insufficiency, elastic stockings or bandages are poorly tolerated and may initiate a clot.

If the patient complains of pain and discomfort from wearing elastic supports, deep venous occlusion is likely.

The dermatitis from stasis improves with rest and elevation of the limb. In cases of severe dermatitis seven to ten days in bed is more valuable than seven to ten months of ambulatory office care.

Treatment of Stasis Ulcers

In dealing with small stasis ulcers, I cleanse twice daily with hydrogen peroxide and then apply sterile Gelfoam powder mixed with Neosporin® powder.* This is followed by an elastic bandage or elastic stocking.

Pinch grafts applied to the ulcer as an office procedure are remarkably effective.

Large stasis ulcers will often require grafting and stripping of veins but a vigorous attempt to heal the ulcer by other means is justified.

The modalities which I use most often are as follows:

1. *Gelfoam powder and Neosporin powder:* Very effective in small ulcers, often effective in larger ulcers.

2. *Unna Boot:* This zinc-gelatin bandage must be applied after the leg has been elevated for at least 15 minutes. The ulcer may be covered directly with the boot.

3. *Gold leaf:* A thin layer of 23 karat gold film is applied to the ulcer. Before application the ulcer is dabbed with 70 per cent alcohol, and after application pressure is applied with a cotton ball. The gold leaf is held in place with roller gauze. This procedure is repeated every five to seven days. In my experience it has been remarkably effective.

4. *Adhesive tape method:* The ulcer is covered with adhesive tape which is left in place for five to seven days.

If after six weeks the ulcer shows no sign of healing, skin grafting must be considered.

As to venous operations, if the symptoms are minor to moderate, operation can be deferred. While the symptoms may lessen, the etiological mechanisms will never disappear and operation early might prevent future dermatitis and trouble. My preference is for venous ligation and venous stripping since this gives more complete eradication of the diseased organs and diminishes the need for future sclerosing injections.

GENERIC AND TRADE NAMES OF DRUGS

Tolazoline—*Priscoline.*
Phenoxybenzamine—*Dibenzyline.*
Azapeptine phosphate—*Ilidar.*
Phentolamine—*Regitine.*
Nicotinyl alcohol—*Roniacol.*
Polymyxin B sulfate, neomycin sulfate and zinc bacitracin—*Neosporin powder.*

*A mixture of polymyxin B sulfate, neomycin sulfate and zinc bacitracin.